CONNECTICUT DEPARTMENT OF PUBLIC HEALTH

Keeping Connecticut Healthy

Introduction to Drinking Water Standards

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Monitoring, Reporting and Enforcement Unit

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Drinking Water Section

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Monitoring, Reporting and Enforcement Unit

Monitoring and Reporting	Enforcement
Inventory Maintenance	Notices of Violation
Water Quality Monitoring Schedules	Civil Penalties
Maximum Contaminant Level Violations	Consent Orders
Monitoring and Reporting Violations	Administrative Orders
Treatment Technique Violations	
Public Notification	
Consumer Confidence Reports	

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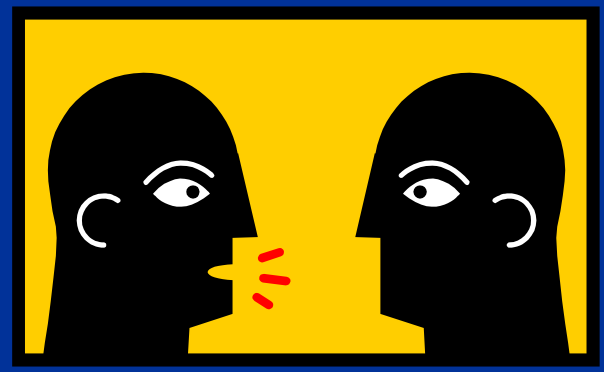
Discussion Topics



- Total Coliform Rule
- Lead and Copper Rule
- Website Tour
- Miscellaneous Compliance Tips

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Drinking Water Standards

The Safe Drinking Water Act (SDWA)

- SDWA was passed by Congress in 1974 (Amended in 1986 and 1996)
- Regulates the nation's public drinking water supply to protect public health
- SDWA authorizes US EPA to set national health-based standards
- Applies to all public water systems
- Most direct oversight of PWS is conducted by state drinking water programs
- States draft regulations to adopt the standards and can apply to EPA for "primacy" for the authority to implement SDWA

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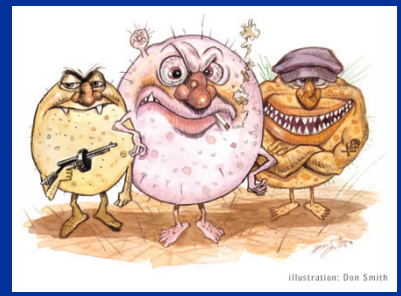
Total Coliform Rule



- **Purpose:** Improve public health protection by reducing fecal pathogens to minimal levels through control of total coliform bacteria, including fecal coliforms and *Escherichia coli (E. coli)*.
- **Compliance:** Maximum Contaminant Level (MCL) based on the presence or absence of total coliform bacteria.
- **Applicability:** All public water systems.
- **Benefits:** Reduction in risk of illness from disease causing organisms associated with sewage or animal wastes. Disease symptoms may include diarrhea, cramps, nausea, and possibly jaundice, and associated headaches and fatigue.

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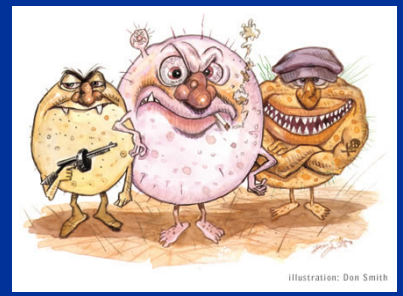
Total Coliform Rule



Routine Monitoring Requirements:

Classification	Population	Monitoring Req.
NC	<1,000	1 / Quarter
CWS	25 – 1,000	1 / Month
CWS, NC	1,001 – 2,500	2 / Month
CWS, NC	2,501 – 3,300	3 / Month

- Routine monitoring requirements are scaled according to PWS classification and population
- Systems shall collect samples at regular intervals throughout the month (Exception: GW systems serving a population of 1000 or less may collect all samples on a single day if they are taken from different sites.)

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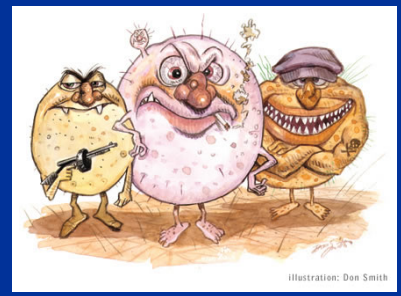
Total Coliform Rule



Routine Monitoring Requirements:

- The residual disinfection concentration shall be measured at the same time as each Total Coliform Sample (routine or repeat)
  - Presence will invalidate the sample if the system is not approved for continuous chlorination
- All TC Positive samples shall be analyzed for fecal coliforms or E coli
- Upon notification of an E coli or fecal positive, the system must call the Department by the end of the day

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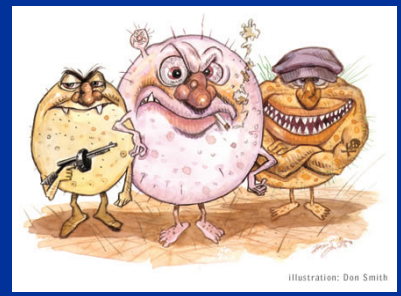
Total Coliform Rule



Routine Monitoring Requirements:

- A minimum of five routine samples shall be collected in the calendar month following any routine TC+
- TC+ samples can be invalidated if:
  - Laboratory verifies improper sample collection or analysis, OR
  - System determines that the contamination is a domestic or non-distribution system problem, OR
  - The Department has substantial grounds that the situation does not reflect water quality in the distribution system

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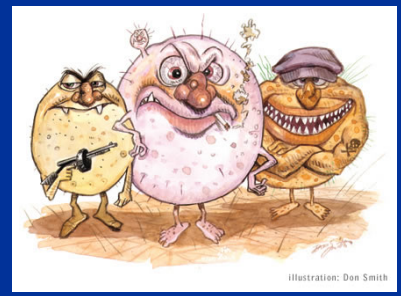
Total Coliform Rule



Repeat Monitoring Requirements:

- Repeat samples shall be collected within 24 hours of the confirmed TC positive result
  - If samples cannot be collected within 24 hours, the Department may grant an extension up to 96 hours
- 1 routine sample = 4 repeat samples
- 2 or more = 3 repeat samples per positive routine
- Repeat samples shall be collected at the site of the Original TC+, within 5 service connections Upstream and Downstream of the original TC+ and from any OTher location
- Process continues until all repeat samples are (-) or the system is in violation of the MCL

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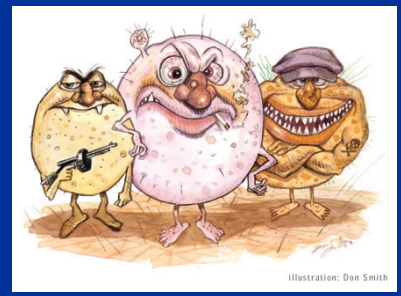
Total Coliform Rule



Total Coliform Rule Compliance:

- Maximum Contaminant Level Violations
  - If Less than 40 samples are collected in a month: More than one (1) sample is TC positive
  - If 40 or more samples are collected in a month: More than five (5.0) percent are TC positive
  - If any repeat sample is E coli or fecal positive or if a routine E coli or fecal positive is followed by a repeat TC positive

    This is an acute risk violation!
  - TCR MCL violations must be reported to the DWS no later than the end of the next business day after learning of the violation

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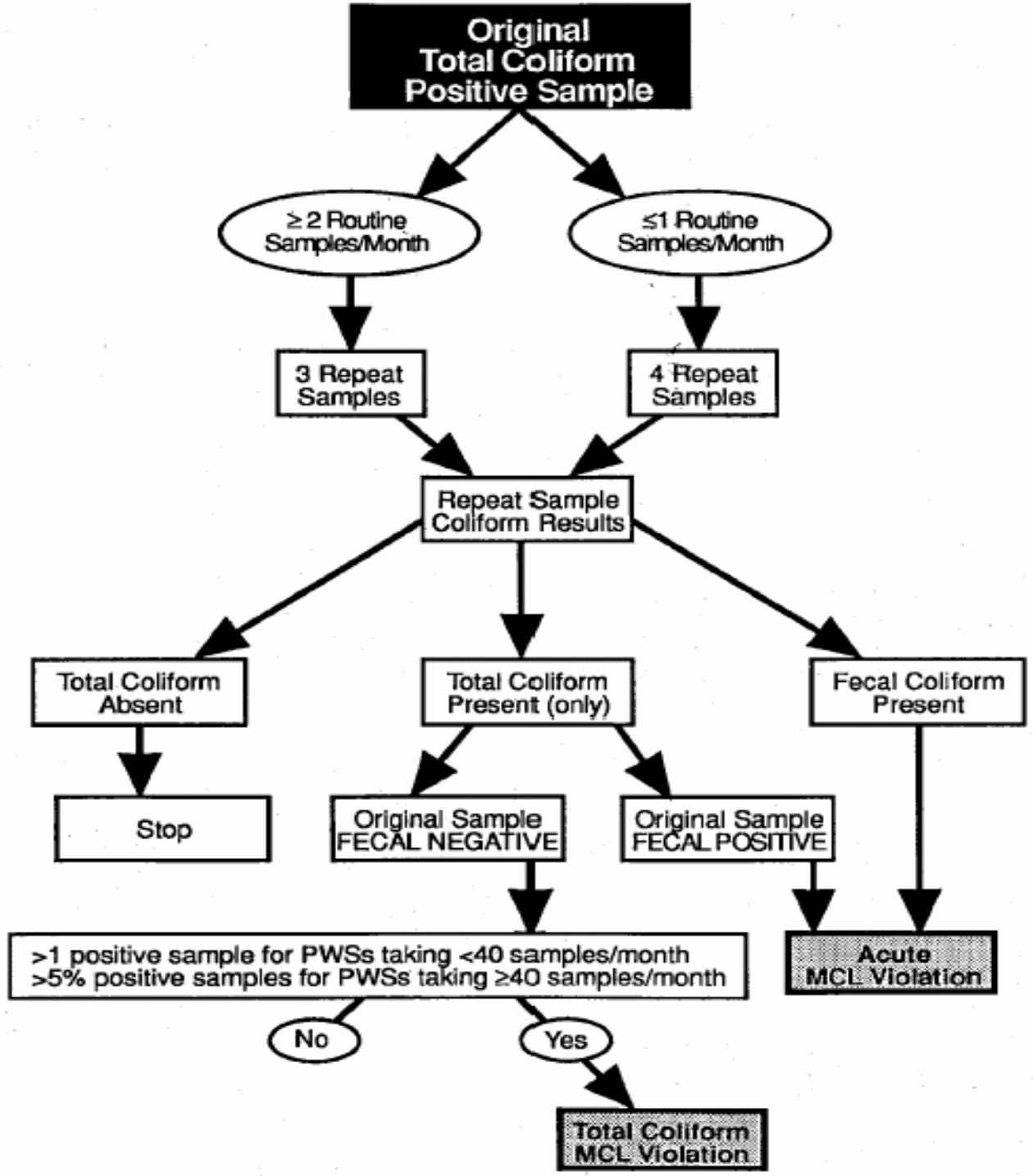

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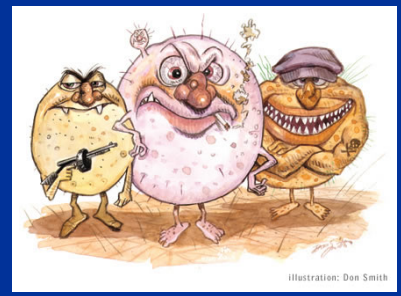
Total Coliform Rule



Public Notification (PN) Requirements:

- Tier 1 Violation (PN within 24 hours)
  - TCR MCL Violations (Acute Risk)
- Tier 2 Violation (PN within 30 days)
  - TCR MCL Violations
  - TCR Monitoring and Reporting Violations

Total Coliform Rule

Lunch Break
Total Coliform Rule Scenarios

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Lead and Copper Rule

- **Purpose:** Protect Public Health by minimizing lead and copper levels in drinking water, primarily by reducing water corrosivity.
- **Compliance:** Action level for lead (0.015 mg/L) and copper (1.3 mg/L) based on 90th percentile of tap water samples.
- **Applicability:** All community and non-transient, non-community public water systems.
- **Benefits:** Reduction in risk of exposure to lead that can cause damage to the brain, red blood cells and kidneys. Reduction in risk of exposure to copper that can cause stomach and intestinal distress, liver or kidney damage, and complications of Wilson's disease.

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Lead and Copper Rule

Lead and Copper Tap Sampling:

- Number and type of sample sites is based on system size (population) and classification
  - **Tier 1** - Single family structures that: contain copper pipes with lead solder installed after 1982 or contain lead pipes; or are served by a lead service line.
  - **Tier 2** - Buildings, including multiple-family residences that: contain copper pipes with lead solder installed after 1982 or contain lead pipes; or are served by a lead service line.
  - **Tier 3** - Single family structures that contain copper pipes with lead solder installed before 1983.
  - **Non-Tier** - Representative site in which the plumbing materials used at that site would be commonly found at other sites served by the water system.

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Lead and Copper Rule

Lead and Copper Tap Sampling:

System size (number of people served)	Number of sites (standard monitoring)	Number of sites (reduced monitoring)
>100,000	100	50
10,001 to 100,000	60	30
3,301 to 10,000	40	20
501 to 3,300	20	10
101 to 500	10	5
≤100	5	5

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Lead and Copper Rule

Lead and Copper Tap Sampling:

- Standard monitoring is conducted every 6 months
- Eligible for reduced monitoring (Annual) if system meets both action levels during two consecutive 6-month monitoring periods
- Eligible for reduced monitoring (Triennial) if system meets both action levels during three consecutive annual monitoring periods
  - Systems on reduced monitoring shall collect all samples during the months of June, July, August and September (collection period)

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Lead and Copper Rule

Lead and Copper Tap Sampling:

- First draw samples must be collected at cold water taps in homes/buildings that are typically used for consumption.
  - Each first-draw tap sample shall be one (1) liter in volume and have stood motionless in the plumbing system of each sampling site for at least six (6) hours.
- Systems unable to collect first-draw samples based on operational constraints (i.e. continuous operation) may substitute non-first-draw samples provided notification is made to the DWS in writing.

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Lead and Copper Rule

Lead and Copper Rule Compliance:

- An exceedance of either action level triggers additional requirements:
  - Water Quality Parameter Monitoring
  - Corrosion Control Treatment (CCT) Evaluation and Installation
  - Source Water Monitoring/Treatment
  - Lead Public Education (lead exceedance only)
  - Lead Service Line Monitoring and/or Replacement (repeated lead exceedance only)
  - Copper Public Notification (Tier 2) (copper exceedance only)

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Lead and Copper Rule

Water Quality Parameters (WQPS):

- Required by all systems serving >50,000 and by all systems not meeting the action levels
- Used to determine water corrosivity and help evaluate CCT installation and operating levels
- Includes pH, alkalinity, calcium, conductivity, orthophosphate, silica and temperature
- Samples are collected in the distribution system and at each entry point
- After installing CCT and conducting follow-up monitoring, the State sets operating ranges and/or limits for selected WQPS (normally pH and phosphate)

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Lead and Copper Rule

Corrosion Control Treatment:

- Required by all systems that exceed either action level
- System shall recommend optimal CCT within 6 months of an exceedance
- Once the State approves the recommended CCT, the system has 24 months for installation
- System must conduct follow-up tap lead and copper and WQPS monitoring for two consecutive 6-month monitoring periods
- CCT steps may be suspended at any time if the system meets both action levels for two consecutive 6-month monitoring periods

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Lead and Copper Rule

Lead Public Education:

- Only required if the lead action level is exceeded
- Informs customers about lead health effects, sources and what can be done to reduce exposure
- May be provided in billing inserts, pamphlets, brochures, newspaper notices and public service announcements (PSA)
- Lead education materials must be delivered within 60 days of the exceedance and annually thereafter (every 6 months for PSAs)
- May be discontinued when the system meets the lead action level during the most recent 6-month monitoring period

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Lead and Copper Rule

Source Water Monitoring:

- Required by all systems that exceed either action level
- System shall conduct lead and copper monitoring at each entry point within six months of an exceedance
- Base on the results, if the State requires source water treatment, the system has 24 months for installation
- After follow-up lead and copper tap and entry point monitoring, the State may set maximum permissible levels for source water lead and copper.

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Lead and Copper Rule

Lead Service Line Monitoring/Replacement:

- Required by all systems that exceed the lead action level after installing corrosion control or source water treatment
- System shall annually replace at least 7% of the initial number of lead service lines in the distribution system
- System may cease replacing lead service lines when the system meets the lead action level during two consecutive 6-month monitoring periods

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Lead and Copper Rule

How to Calculate 90th Percentiles

- Step 1: Place lead or copper results in ascending order
- Step 2: Assign each sample a number, 1 for lowest value
- Step 3: Multiply the total number of samples by 0.9 Example: 20 samples x 0.9 = 18th sample
- Step 4: Compare 90th percentile level to the action level

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Lead and Copper Rule

Example: 90th Percentile - 5 Samples

Assume 5 samples are collected with lead results as follows:

Site 1: 0.008 mg/L

Site 2: 0.011 mg/L

Site 3: 0.020 mg/L

Site 4 : 0.008 mg/L

Site 5: 0.008 mg/L

What is the 90th Percentile Value?

Lead and Copper Rule

Example: 90th Percentile - 5 Samples

Step 1 & 2: Order and rank results from lowest to highest:

No 1: 0.008 mg/L
No 2: 0.008 mg/L
No 3: 0.008 mg/L
No 4: 0.011 mg/L
No 5: 0.020 mg/L

Step 3: Multiply the number of samples by 0.9
0.9 x 5 = 4.5th sample

Step 4: Average the 4th & 5th samples highest samples to get 90th percentile value = 0.016 mg/L

$$\frac{0.011 \text{ mg/L} + 0.020 \text{ mg/L}}{2} = 0.0155 \text{ mg/L}$$

Step 5: Compare to lead action level ⇒ Exceedance

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Lead and Copper Rule

Example: 90th Percentile - 10 Samples

Assume 10 samples are collected with lead results as follows:

Site 1: 0.005 mg/L
Site 2: 0.015 mg/L
Site 3: 0.005 mg/L
Site 4 : 0.014 mg/L
Site 5: 0.014 mg/L
Site 6: 0.005 mg/L
Site 7: 0.040 mg/L
Site 8: 0.014 mg/L
Site 9: 0.014 mg/L
Site 10: 0.005 mg/L

What is the 90th Percentile Value?

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Lead and Copper Rule

Example: 90th Percentile - 10 Samples

Step 1 & 2: Order and rank results from lowest to highest:

No. 1:	0.005	No. 6:	0.014
No. 2:	0.005	No. 7:	0.014
No. 3:	0.005	No. 8:	0.014
No. 4:	0.005	No. 9:	0.015
No. 5:	0.014	No. 10:	0.040

Step 3: Multiply the number of samples by 0.9

0.9 x 10 = 9th sample

Step 4: 9th sample = 0.015 mg/L

Step 5: Compare to lead action level ⇨ No Exceedance

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Additional Information

Drinking Water Section Website:
http://www.dph.state.ct.us/BRS/Water/DWD.htm

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